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MEDICAL NEWS LETTER

Vol. 37

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Comprehensive Medicine

William A. Steiger MD and Francis H. Hoffman MD, Temple University School of Medicine, Philadelphia, Pa. Some Principles of Comprehensive Medicine. Clinical Research 8:353-354, December 1960.

Comprehensive Medicine is the cumbersome title appended to some teaching effort in almost every contemporary medical school. Terms such as "holistic," the "whole person," or "psychosocioeconomic" have been used to describe its point of view. However, these terms are so general that they are almost meaningless. Comprehensive Medicine is usually taught in a clinic—medical, pediatric, or gynecologic. Operationally, this teaching is accomplished in a variety of ways: from simply attaching a psychiatrist or psychologist to such a clinic as consultant to complete full-scale integration of psychiatrists and internists (or gynecologists or pediatricians) with additional aid from sociologists, psychologists, and social workers. The attached consultant, regrettably, is often viewed by the biologically oriented clinic staff with suspicion and distrust and is at most a junior varsity side-line coach rather than a real member of the varsity team. Moreover, in some clinics what is incorrectly called Comprehensive Medicine consists merely of bringing together into one clinic area a variety of biologically oriented specialists. This is a different and possibly desirable geographic change, but introduces little new in the physician's view of his patient. Full-scale integrative efforts, on the other hand, recognize both in theory and in practice that medicine is at least as much a social science as a natural science and foster a truly multidisciplinary approach to patient understanding and care.

The first principle of Comprehensive Medicine maintains a practicing physician's primary interest should be people. This seems to be such a self-evident truth that sometimes it is shrugged off. A careful scrutiny of much of medicine, however, will disclose that its primary interest is not man, but disease. Certainly, most medical meetings, medical journals, and teaching efforts are concerned with disease (the mechanisms of edema in heart failure, globulins in myeloma, treatment of diabetes, et cetera). As a matter of fact, if a visitor from Mars were to read a current textbook of medicine or a current medical journal, he might have a very difficult time deciding to what earth species they apply.

It is not intended that physicians should forsake interest in disease. Health and disease are the particular facets of man's existence with which the medical profession deals. It is intended that medicine consciously realize that man exists before disease, that disease is an attribute of existence, and that disease be viewed within the broad framework of societal man.

Such an orientation would give to physicians cultural perspective and humanitarian attitudes and remove the stigma of physicians being mere technicians. It would provide them with the potential to understand other cultures

with their differing value systems, moralities, and religions. It might even result in an understanding of their own and others' intolerances and prejudices. Hopefully, the placing of man as the foundation stone of medicine would result in an end to the wasteful polemic between organic and psychologic etiologies of disease. The realization would grow that "organic" and "psychologic" are mere words that summarize descriptively two ways of looking at and measuring a unitary system—that system being man.

From these considerations arises the second principle of Comprehensive Medicine that there be no hierarchy of disease in terms of the physician's concern for the patient. By this is meant, of course, that a sick person is a sick person regardless of his disease classification. Many medical clinics are known deprecatingly as "barbital clinics" because not enough of their patients exhibit the hierarchically preferred "organic" diseases. Some clinics, apparently more interested in disease than in sick people, even resort to keeping some "mitral stenotics" and the like around in order to maintain student interest. And, woe betide the resident who admits a senile or neurotic patient to the ward service!

Even among physicians, it seems that patients with emotional problems are often not valued as highly as those with disorders that are usually described in terms of organ specific changes. Often, it is implied that the person with emotional conflicts is somehow personally responsible for his troubles. Therefore, such a patient is less deserving of sympathetic consideration than the person who has been innocently victimized by "organic" disease.

The third principle of Comprehensive Medicine is that since prejudices and taboos are part of all of us, those practicing medicine should be aware of our feelings, both positive and negative, toward kinds of people, diseases, and treatment. The physician should cultivate a high degree of self awareness. Such self awareness would permit patient management to be directed more by logic and intelligence than by irrationality and emotion.

To state these basic principles of Comprehensive Medicine is reasonably simple; to accomplish them is a much more difficult matter. It should be evident that medical education must involve a great deal more than transmission of the facts of anatomy, physiology, and disease. If the graduate in medicine is to choose people as his primary focus, he must have knowledge of people that is both longitudinal (time-course of man) and latitudinal (comparative roles of man) in perspective. An exposure to the paleontologic evidence for the origin of man would seem to be a logical place to begin, followed by an historical survey of the major sociologic and economic developments with their concomitant alterations in disease morbidity. An appreciation of the differing value systems of representative cultures would also give the physician a better grasp of the problems of world health and an understanding of groups whose values and standards differ from his and his group's. It is believed that a consequence of increased knowledge of others, past and

present, would be increased knowledge of self. An educational program so designed—when coupled with current teaching of psychologic and biologic dynamics—should result in the type of physician, and perhaps citizen, needed by today's world.

* * * * *

Treatment of Peptic Ulcer

Joseph B. Kirsner MD and Walter L. Palmer MD, Department of Medicine, The University of Chicago, Chicago, Ill. Treatment of Peptic Ulcer—Current Concepts. Amer J Med 29: 793-803, November 1960.

Excluding the many new remedies of transient interest or of no value, there have not been any significant modifications in the principles of ulcer therapy in recent years. Currently, there appear to be at least four trends in therapy in addition to the "standard" approach: (1) rejection of all forms of treatment based upon the philosophy that peptic ulcer pursues an independent course uninfluenced by identifiable circumstances or known treatment; (2) therapeutic liberalism, emphasizing the lack of objective evidence for the value of diet and antacids; (3) psychiatric concept of the genesis of peptic ulcer, attributing the results of medical treatment to subtle psychogenic influences rather than to pharmacologic effects; and (4) organic concept of peptic ulcer, but with extremely speculative causes, including alleged deficiencies of "healing substances" in animal tissues, and in serum and urine of patients with ulcers. These and other theories, challenging established methods of treatment, yet in themselves lacking significant supporting evidence, contribute to the present confusion and uncertainty in management of peptic ulcer.

In the absence of an established cause for peptic ulcers, treatment continues to emphasize protection of the gastroduodenal mucosa from the digestive action of hydrochloric acid and pepsin. This objective probably would be accomplished by increasing tissue resistance without altering gastric secretion. However, satisfactory methods for directly improving the defenses of the stomach and duodenum have not become available. Complete and permanent elimination of hydrochloric acid would abolish peptic ulcer regardless of tissue susceptibility and other etiologic factors; but no procedure, except total gastrectomy, consistently produces complete anacidity. Despite these limitations, comprehensive medical therapy facilitates healing and reduces the frequency of complications and recurrences.

Diet. There is no evidence relating the usual peptic ulcer to abnormal protein metabolism or to nutritional deficiency. Consequently, there is no scientific rationale for unusual preparations incorporating animal tissue extracts

with food supplements. Protein-vitamin-mineral supplements provide additional calories and proteins; however, they are not indicated when the intake and digestion of food are normal.

There is no conclusive proof that coarse or highly seasoned foods are directly irritating to an ulcer or that maintenance of a soft diet increases the rate of healing. The patient with an ulcer is capable of eating a more liberal diet than has been advocated in the past and dietary restrictions do not uniformly cure peptic ulcer. However, experience of the intelligent patient which consistently implicates certain foods in the persistence or intensification of pain is not without importance; this information provides a useful means of relieving distress. The most practical approach is to avoid the extremes of rigid restriction and nutritional nihilism.

Foods stimulate gastric secretion by neurogenic, chemical, mechanical, and humoral mechanisms. All foods may increase gastric acidity and pepsin output, but some are more stimulating than others. Meat, fish, and eggs increase gastric secretion; fruits, vegetables, and foods rich in carbohydrates evoke a lesser secretory response. Efforts to lower gastric secretion by food presumably would involve a diet low in protein and high in carbohydrate and fat, but there are practical and theoretic objections to this type of regimen. Milk—a traditional mainstay of the ulcer diet—does not decrease gastric acidity.

Dietary management involves frequent feedings of bland foods, providing an adequate intake of proteins, carbohydrates, calories, minerals, and vitamins and facilitating the neutralization and buffering of the gastric content. The diet usually includes milk and cream which is taken hourly or every two hours. In the absence of gastric retention, additional foods are administered as feedings. With complete relief of ulcer distress, a bland diet of three meals is prescribed, supplemented by a feeding later in the evening. All foods should be well cooked and chewed thoroughly—they need not be pureed. Palatable foods prepared attractively, regular eating habits, and physical and emotional relaxation at the time of eating are important considerations. Coffee and tea are permitted in moderation. The "bland" three meal diet is continued indefinitely with additions as indicated by the progress of the patient. The dietary program should be described clearly to the patient; the casual suggestion to "watch your diet" or "avoid irritating foods" is ineffectual and should be avoided.

The standard diet in an ulcer condition seems to be high in saturated fats and relatively low in unsaturated fats. However, in the authors' experience, the incidence of arteriosclerosis and coronary artery disease has not been excessive among patients with peptic ulcer. Decrease in the caloric and fat content of the diet is probably desirable in the obese patient and in individuals with elevated blood cholesterol; perhaps the diet should be low in saturated fatty acids and high in poly-unsaturated fatty acids.

Antacids. The purpose of antacid therapy is constant neutralization of the continuously secreted acid gastric content. The ideal antacid should

possess these advantages: prolonged effective neutralization when administered orally in acceptable amounts, no untoward systemic effects such as alkalosis, no cathartic or constipating action, no interference with digestive or absorptive processes, palatability, and low cost. Ideal neutralization is maintenance of the pH of the gastric content between 4.0 and 5.0 or higher; on the other hand, peptic ulcer may heal with less complete control of gastric acidity. Antacids cannot be selected for clinical use solely on the basis of in vitro neutralizing capacity because laboratory conditions cannot reproduce the secretory activity of the human stomach. Neutralizing efficiency in patients with peptic ulcer is limited by the excessive gastric secretion and by the rate of gastric emptying. There is no acceptable evidence for "acid rebound" after antacid therapy.

The ideal antacid preparation thus far has not been developed. The most potent compound probably is calcium carbonate administered in quantities of 2 to 4 gm hourly during the day and evening. The neutralizing effect is enhanced by simultaneous administration of atropine sulfate, anticholinergic compounds, or by 5 ml oleic acid, prolonging the emptying of the stomach. Dosages of 8 gm of calcium carbonate are not more effective than 4 gm. The principal disadvantage of calcium carbonate is constipation, especially in older patients. Therapy with milk and calcium carbonate may be complicated infrequently by the hypercalcemic syndrome, particularly in older patients with hypertension and preexisting impairment of renal function; or when renal function is disturbed by gastrointestinal hemorrhage or electrolyte and fluid depletion.

Magnesium carbonate and magnesium oxide are potent antacids; many other compounds neutralize gastric acidity in varying degrees. Aluminum hydroxide, aluminum phosphate, and basic aluminum carbonate alone in doses of 8 to 16 ml and in various mixtures partially neutralize gastric acidity.

Anion exchange resins, alone or in combination with antacids, may lower gastric acidity partially in man. Bismuth salts, hog gastric mucin, protein hydrolysates, and sodium carboxy-methylcellulose, alone or in combinations, are ineffective. The antacid effect of sodium bicarbonate is pronounced but transient.

Antacid tablets are inferior to powdered or liquid antacids because of the smaller amounts entering into the reaction with hydrochloric acid. Their principal indication may be as adjunct medication taken away from home; their usefulness depends upon adequate dosage. Gastric acidity also may be neutralized by continuous administration of milk and cream, alkali, or food supplements administered through an intragastric tube for several hours at a time or continuously for several days. This procedure has been utilized in patients with gastric hypersecretion and severe pain not responding to ordinary measures and, occasionally, in treatment of massive hemorrhage; it is contraindicated in the presence of pyloric obstruction.

Antacids act locally upon the gastric contents. Because they do not influence the acid-secreting cells of the gastric secretory mechanism, their

neutralizing effect is temporary and disappears when medication is discontinued. Because ulcers recur, therapy must be prolonged. Administration of small quantities of mild antacids immediately after meals or "as needed" is impractical and ineffective.

Gastric Antisecretory Compounds. The value of anticholinergic drugs is based on the theoretic possibility of prolonged suppression of acid secretion and upon the concept that parasympathetic (vagal) hyperactivity is chiefly responsible for the gastric hypersecretion of duodenal ulcer. Other phases of gastric secretion, including the antral mechanism and the parietal cells, also are influenced by these agents. Most anticholinergic drugs decrease gastrointestinal motility and diminish muscle spasm; however, this effect is not essential to the healing of peptic ulcer. Anticholinergic drugs do not mask the symptoms of perforation.

Average doses of tincture or powdered extract of belladonna do not inhibit acid secretion significantly in patients with peptic ulcer. Atropine sulfate, 0.5 mg given orally three or four times daily, is partially inhibitory; the same dosage intramuscularly is more effective. Synthetic atropine substitutes are less potent than atropine. The quaternary ammonium compounds may inhibit hydrochloric acid temporarily. However, these drugs cause disturbing side effects and are not intended for use in ulcer therapy. More than 100 gastric antisecretory compounds have been developed in the past 10 years.

Because the action of these drugs is limited to the period of administration, they must be taken continuously; however, patients occasionally appear to develop a tolerance to this medication. Important considerations in anticholinergic therapy are sufficient quantities and sustained administration. The most useful clinical guide as to adequate dosage probably is occurrence of dryness of the mouth.

No single anticholinergic compound excels in gastric inhibitory capacity, clinical tolerance, and therapeutic value. In general, the drugs that lower acidity most effectively also produce systemic manifestations of parasympathetic inhibition. Combination of anticholinergic drugs with tranquilizers does not offer any advantages justifying the added cost.

The ideal gastric antisecretory agent suppressing acidity for long periods after oral administration, without development of tolerance and with minimal or no side effects, thus remains to be synthesized. Present compounds do not produce true "medical vagotomy." However, they are superior to belladonna, atropine, methantheline, and diphemanil. As adjuncts to antacids, in sufficient amounts they probably facilitate more efficient neutralization of the gastric content. Their value in preventing the complications of peptic ulcer and in decreasing the need for surgery has not been established.

Substances Alleged to Influence Tissue Resistance. Many substances have been alleged to improve the resistance of the upper digestive tract to

ulceration. These include hormonal preparations such as pregnant mares' urine, estrogens, DOCA, parathyroid extract, and various extracts of animal stomach, duodenum, and colon, including robuden. There is no conclusive evidence for the therapeutic value of these materials.

Peptic ulcer has been attributed to a "disturbance" of the central nervous system. Recently, a new compound has been proposed as an anti-ulcer agent theoretically correcting this "disturbance," perhaps by improving gastric circulation. This concept lacks adequate supporting evidence; clinical reports available thus far are not convincing.

Other methods include use of 10 to 12 small (75 to 100 ml) transfusions of whole blood alternating with 20 or 25 injections of 0.5% novocaine subcutaneously or intravenously, infiltration of the pneumogastric nerves with novocaine, electrocoagulation of the prefrontal lobe of the brain, and electronarcosis. The value of these methods requires further study; they are not utilized in this country.

New Ulcer Cures. Countless new "cures" for peptic ulcer continue to appear, partly because prevailing methods of treatment are not entirely satisfactory, partly because of uncontrolled overenthusiastic evaluation. The rationale for their use often is obscure, speculative, or nonexistent. The list includes detergents, such as sodium alkyl sulfate, bile salts, and cabbage juice. More recently advocated "antiulcer" preparations include garlic juice, chymotrypsin, glutamine, phenothiazine derivatives, "convalescent serum" from ulcer patients, and human gamma globulin. So-called enzyme substrate therapy is alleged to correct an "imbalance" of enzymatic activity, neutralizing intramucosal alkali in the acid-secreting cells of the stomach and intramucosal acid in the alkali-secreting cells of the duodenum. There is no conclusive evidence for this concept or for its clinical value. Compounds inhibiting enzyme carbonic anhydrase may lower the output of hydrochloric acid after intravenous administration; however, large amounts do not demonstrably influence gastric secretion in man. Antihistaminic compounds do not decrease gastric acidity significantly and are ineffective in treatment of peptic ulcer.

Roentgen Radiation of the Stomach. Roentgen radiation to the stomach may be utilized as an adjunct in medical therapy to decrease or abolish secretion of hydrochloric acid. There is no evidence that radiation per se promotes proliferation of connective tissue or directly influences the healing of an ulcer. The inhibitory effect upon gastric secretion depends upon destruction of the parietal cells. The antisecretory effect is variable and unpredictable. Complete achlorhydria develops in a small percentage of patients (7%), continuing from several weeks to 6 to 12 months and in 3% for periods up to 5 years. In approximately 40% of patients, acid secretion decreases by more than 50% and for long periods. Development of achlorhydria is followed invariably by complete healing of the ulcer and by no recurrence for the duration of the achlorhydria. Roentgen radiation of the stomach has

not been adopted generally despite favorable therapeutic results. Its chief indication is for recurrent peptic ulcer not consistently controlled by careful medical management in individuals above the age of 45 years.

Special Problems. There is no conclusive evidence that average smoking increases gastric secretion significantly. Moderate smoking seems harmless in many instances. Excessive smoking, on the other hand, is undesirable perhaps because of the decreased intake of food and diminished neutralization of gastric acidity. The recommendation of complete abstinence is preferable to the ineffectual suggestion of "decreasing" the quantity of tobacco. Because alcohol tends to increase secretion of hydrochloric acid, its use should be avoided. Excessive drinking of coffee may irritate the gastroduodenal mucosa and reactivate peptic ulcer. Numerous medicaments may predispose to recurrence of peptic ulcer, perhaps by irritating the gastroduodenal mucosa and increasing gastric acidity.

Physical and Emotional Stress. Prolonged emotional stress may increase secretion of hydrochloric acid and the susceptibility of the gastroduodenal mucosa to injury. Consequently, rest and relief of emotional tension are important adjuncts in therapy. The precise role of sedatives in ulcer therapy is not clear; they do not decrease gastric secretion or motility but the relaxation and rest are beneficial. "Tranquilizing" drugs do not offer any special advantages in ulcer therapy.

* * * * *

The Adenoid Problem

Joseph Lubart MD, 960 Park Avenue, New York 28, N. Y. Arch Pediat
77: 491-495, December 1960.

Tonsillectomy is the most frequently done procedure in all of surgery. The advent of sulfa drugs and later the antibiotics dampened somewhat the enthusiasm for the operation. Results achieved with the "wonder" drugs have made a great many practitioners regard the tonsil operation as rarely indicated. This attitude is correct with certain notable exceptions as regards the tonsil itself. In the infrequent instances where tonsils are so large as to interfere with swallowing, no one would argue with the advisability of removal; the other exception is where a new growth of the tonsil is suspected. Aside from these indications, the only value of a tonsillectomy derives from the fact that the adenoids are usually removed at the same time. This important consideration has never been sufficiently emphasized.

It is certain that tonsils as they are regarded today existed in children centuries ago. It is noted that Celsus clearly described the operation of tonsil enucleation. Hypertrophy of the postnasal lymphoid tissue (adenoid) was not considered of much importance until Meyer of Copenhagen, in 1868,

distinguished the baneful influence of this growth on the hearing and general economy of the growing child.

Although chemobiotics are of great value in combating and localizing acute upper respiratory infections, they are valueless in removing the obstructive effect of enlarged adenoids which bring on these infections. Even moderate enlargement of the adenoids can fill the small postnasal space in children and interfere with nasal respiration and sinus drainage. Regarding the etiology of paranasal sinus disease, it has been found that the most common source of infection is from diseased adenoids and tonsils. Involvement of the bone is much more common than in adults because the bone in the young is cancellous and soft. Radiography is unreliable because of the thickness of the bones of the face.

Paranasal sinus disease in the young occurs much more frequently than is generally suspected and occurs in all stages of sinus development. One study of 204 children with sinusitis showed a majority had symptoms of nasal obstruction and rhinitis, but in only 16 was the sinusitis of a chronic type, thus indicating that early removal of obstructive adenoid growths could reverse the progress of the sinusitis with significant reduction of the high incidence of sinus involvement in children.

Orbital cellulitis from spread of inflammation of anterior ethmoid cells—a common complication of upper respiratory infection in children—recurrent epistaxis due to sinusitis, and impaired hearing due to nasopharyngeal obstruction and infection are all caused in large measure by interference with postnasal drainage and the resultant sinusitis.

In marked contrast to other bodily ailments, the incidence of upper respiratory infections is as high—or higher—in children as in adults. The reasons for this are mainly prevalence of exanthematous diseases in this age group, comparatively large size of sinus openings, and impaired ventilation due to mouth breathing caused by adenoids which usually have regressed by the time the patient reaches adult life.

The only effective treatment for enlargement of the adenoids is surgical removal. Nose drops give only temporary relief and radiation is only useful in shrinking small amounts of residual adenoid tissue in areas inaccessible to surgical approach. Results of adenoidectomy depend on the adequacy of the removal. Too often, the occasional operator may take only a few blind stabs with the adenotome leaving adenoid tissue in crucial areas with complete defeat of the purpose of the operation. No age restriction exists with regard to adenoids; they should be removed whenever there are nasopharyngeal obstructive symptoms. Adenoids have been removed in infants as young as several months with excellent results.

Symptoms caused by adenoid hypertrophy vary in different cases, but the following are the most common:

1. Mouth breathing due to blocking of the post-nasal space
2. Frequent head colds, croup, and bronchitis

3. Earaches, running ears, mastoid infection, and deafness
4. Disturbed sleep and night terrors due to obstructed breathing and cerebral anoxia
5. Nasopharyngeal catarrh and nasal discharge
6. Fetid breath
7. Impairment of voice; "talking through the nose"
8. Difficulty in eating because of obstruction to breathing
9. Snoring during sleep and noisy respiration even when awake
10. Interference with sense of smell due to nasal blockage
11. Mental dullness due partly to infection and partly to associated deafness brought on by the adenoids blocking the Eustachian tube

Even though many children with this problem will outgrow these tendencies, a good many, as a result of repeated upper respiratory attacks will be left with the seeds which in adult life will be the cause of catarrhal deafness and the annoyances and hazards of chronic sinusitis.

* * * * *

Epistaxis

Francis B. Quinn Jr MD, University of California Medical Center, Los Angeles, Calif. Surgical Treatment of Nasal Hemorrhage. Arch Otolaryng 72: 734-742, December 1960.

Recently, two patients were seen with nasal hemorrhage of sufficient magnitude and persistence to require surgical ligation of the blood supply to that organ. One patient bled so severely that hematochezia was present. Because of this finding, an abdominal exploration was initially performed in an unsuccessful search for a bleeding gastrointestinal lesion.

The prompt and complete cessation of bleeding which followed surgical interruption of the blood supply to the nose in each case suggests that these procedures with their low morbidity and complete lack of sequelae should enjoy wider application in cases heretofore requiring extensive cauterization, prolonged nasal packing, and repeated transfusions. It is reasonable to expect that the hospital stay of the typical patient with severe nosebleed might be shortened and rendered more comfortable by an earlier resort to surgical ligation.

Incidence and Etiology

Nosebleed spares no age group. It is seen in all ages—from the toddler who falls and strikes his nose to the elderly arteriosclerotic. The usual local causes are foreign bodies, instrumental or digital manipulation, blows to the head, and infections and tumors of the nasal chambers.

Generalized conditions which can lead to nasal hemorrhage are blood disturbances—such as leukemia, polycythemia, and disorders of the coagulation mechanism—rheumatic fever, scurvy, and increased venous pressure as from emphysema, prolonged coughing or straining, and tumors of the neck and upper mediastinum.

Nosebleeds among the elderly are distressingly frequent, usually arising from the posterior portion of the nasal fossa and generally defying the etiologic diagnosis. In these older patients, one is quite likely to find elevated arterial pressure and evidences of arteriosclerosis. The association between these entities and epistaxis may be fortuitous, however, for although hypertension and medial sclerosis are commonly recognized manifestations of the senium, nosebleed may be seen in their absence.

One series of 212 cases reported characteristic occurrence of epistaxis: 59.9% were in patients over 54 years of age; hypertension was the etiology in 36.4% of cases; etiology was not determined in 25%; trauma was responsible in only 9.9%; 80% of all cases exhibited spontaneous cessation of bleeding.

In his diagnostic endeavors, the clinician is limited to search for the commonest causative factors, he must attempt to exclude potentially serious but undiscovered illness, of which the nasal hemorrhage may be the first sign. When considering severe epistaxis, particular attention must be paid to the nasal hemorrhage which follows a closed head injury. Here, the basilar skull fracture has a definite role in that the line of the fracture may intersect the course of a major blood vessel with resulting hemorrhage into the nasal chambers, paranasal sinuses, Eustachian tube, or nasopharynx proper. As a general rule, injuries which result in a rare appearance of massive, life-threatening epistaxis are those in which the anterior ethmoid artery, internal carotid artery, or cavernous sinus is torn; then, it is sometimes associated with disturbances of vision, facial sensation, or pituitary function, with premonitory aura or intracranial bruit.

There are a number of instances of bleeding from the nose and nasopharynx following head injury. Often the nasal hemorrhage persists in troubling the patient long after the other sequelae of the injury have disappeared.

Diagnostic Procedures

A careful anamnesis is always desirable but not always obtainable when dealing with a patient whose overwhelming concern is the arrest of his nasal hemorrhage. Once the bleeding has been controlled, it is of utmost importance to search the patient's past for possible clues regarding the genesis of the nosebleed. Questions should be directed to the patient which will bring to light diseases of the cardiovascular system, blood-forming tissues, and blood-coagulation mechanism. Presence of a neoplasm in the nose or paranasal sinuses must be suspected and the patient should be questioned

carefully with regard to recent head injury or nasal trauma. The interrogator is wise to pay close attention to symptoms suggesting coronary artery insufficiency or cerebrovascular disease, for these conditions can assume critical stature in the presence of a sudden severe blood loss.

Importance of accurate identification of the bleeding area cannot be overstressed, particularly in cases of serious nature in which ligation of a major vessel appears necessary. As a matter of routine, an estimation of the hemoglobin mass, bleeding and clotting time, concentration of platelets, and blood morphology is made. When history or physical findings suggest the possibility of liver disease, a prothrombin determination should be performed.

Therapy

The most desirable methods of arresting nasal bleeding are those which compress or destroy the bleeding vessel with a minimum of injury to the surrounding structures and the least discomfort to the patient. Precise gentle but firm packing over the offending vessel, either alone or in combination with electrical or chemical coagulation of the bleeding point, will control the great majority of nosebleeds.

The most troublesome hemorrhages generally arise from the relatively inaccessible regions of the olfactory cleft and the posterior choanae. In these cases, cauterization is often impossible and anterior packing is frequently inadequate to control the bleeding. Here the expedient of a posterior choanal or nasopharyngeal pack may be required, not once, but repeatedly.

Various forms of systemic therapy have been recommended in control of epistaxis, including administration of vitamins C and K and estrogenic hormone.

In the course of attacking the source of bleeding, the physician must be mindful of the effect of blood loss upon the patient. Signs of approaching hypovolemic shock are to be watched for, and intravenous infusion of plasma expanders or whole blood should not be withheld. The patient succumbs not from the presence of blood in his nose, but from the lack of blood in his vascular system.

Generous sedation, optimally in the form of morphine sulfate, is both a gesture of kindness and an effective hemostatic maneuver. Anxious tense patients bleed more freely, probably as a result of elevated arterial pressure in combination with the nasal vascular engorgement seen in emotional stress. Frequently, a telephoned order for morphine sulfate will stop the bleeding before the physician arrives on the ward.

Surgical technics, including ligation of various arterial supplies to the nasal area, are described along with discussion of the anatomy of the region. The author declares that the procedures are straightforward and

simple; morbidity is low; complications are few and of rare occurrence; and there is no mortality associated with the operation. Early employment of these technics, he believes, reduces the probability of fatal issue and may even shorten the patient's period of illness by arresting the nosebleed promptly and permanently.

* * * * *

New Tube for Wound Drainage

Arthur J. Lesser MD, Department of Surgery, College of Medical Evangelists, Los Angeles, Calif. The Place of Wound Drainage in Surgery with Description of a New Drain. Arch Surg 81: 870-876, December 1960.

Therapeutic wound drainage for the purpose of removal of collections of fluid or pus may well be one of the oldest forms of surgical therapy. With development of abdominal surgery during the last 100 years, wound drainage has played an important part in surgical technic. In spite of this fact, general agreement as to indications for, and technic of, drainage is still lacking.

Since the discovery of antibiotics, fewer papers have appeared on the subject of prophylactic drainage. However, as is now realized to an increasing extent, antibiotics have not solved the problem of wound infections, especially in cases infected with resistant bacteria. Thus, wound infection continues to be of major concern in present day surgery. Prophylactic use of antibiotics now available is generally agreed to be of little if any value; such use probably contributes to development of resistant bacterial strains. Therapeutic antibiotic administration is, of course, effective only in antibiotic-sensitive infections. Furthermore, antibiotics cannot neutralize the effect of continuous leakage from a viscus; at most, an initial apparent "masking effect" of symptoms is obtained leading to a false sense of security. This is too often followed by sudden aggravation of symptoms, sepsis, collapse, and even death.

It is obvious that meticulous technic, and avoidance of undue trauma and excessive necrotic tissue are important. Above all, prevention of dead space with fluid accumulation is an absolute prerequisite for primary wound healing because blood or serum accumulations serve as potential culture media for bacterial growth.

There are two main principles of wound drainage which must be obeyed: (1) Abnormal fluids or pus should be evacuated as thoroughly as possible. (2) Drains should, in general, be removed as soon as drainage ceases. The first postulate can be only incompletely accomplished with soft Penrose-type drains except in superficial wounds and in areas where drainage is downhill. However, in deeper wounds, gravity can neither overcome

compression and kinking of the soft rubber drain nor counteract negative atmospheric pressure as found in the peritoneal cavity. The result is "overflow drainage." This situation combines a foreign-body reaction with retention of abnormal fluid or pus and may lead to complications.

In order to insure complete evacuation of fluid or pus, single tube, sump, or double lumen type drains connected to a suction machine have been recommended by several authors. However, available double lumen tubes, partly because of stiffness and large caliber, have been used mainly for major localized abscesses. To provide adequate drainage and overcome the disadvantages of a stiff tube, a new double-lumen type tube was designed. The tube is made of pliable rubber with a soft tip, yet without the lumen being unduly compressible. The air inlet tube is small with the air inlet holes being placed for optimal suction.

The new double-lumen tube usually yields adequate drainage even without suction—such as after gallbladder surgery—barring excessive negative pressure in the peritoneal cavity. Also, the tube can be used for syringe aspiration whenever indicated—before removal of the drain or for evaluation of a suspected complication. For continued thorough evacuation of secretions, pus, or blood, a low-suction machine may be connected to the larger lumen; the smaller lumen is left open or is fitted with a loose cotton pledget to serve as a filter. Alternately, the "air inlet" tube also serves for a rinse with saline, enzyme, or antibiotic solutions. A continuous drip can be maintained along with suction if air is allowed to enter through an open end of a Y-tube.

Use in Various Situations

Surgery of Trauma. Because infections, even after seemingly adequate debridement, occur in a high percentage of cases, one or more well-placed suction drains are helpful and can obviate the need for so-called delayed primary closure. Enzymes may also be instilled for continuous enzymatic debridement.

Head and Neck Surgery. In the region of the head and neck, soft rubber drains usually suffice. In radical neck dissection, it has been found that use of one or two suction drains is helpful.

Breast Surgery. In surgery of benign breast tumors, there is a divergence of opinion as to the advantages of drainage. If drainage is used, Penrose or cigarette-type drains will suffice. However, in radical breast surgery, the latter are certainly inadequate. Use of two double lumen drains with negative suction (closed drainage) gives a much better result. Later, when needed, an open type of suction drainage may be employed for three to four days.

Chest Surgery. In chest surgery, the drain can be used for closed or open drainage. Also, a drain can be inserted through a properly sized cannula.

Intraperitoneal Surgery. There are definite limitations to general intraperitoneal drainage; however, because pus will tend to localize in certain anatomic areas, prophylactic or therapeutic drainage can be of benefit in: (1) subphrenic spaces, both anterior and posterior; (2) subhepatic space; (3) greater and lesser omental bursae; (4) lumbar gutters; and (5) pelvis (vesicouterine, or rectouterine spaces in the female, or rectovesical space in the male).

Biliary Surgery. There appears very little justification for ever omitting a drain after gallbladder or bile duct surgery. Through small bile ducts in the bed of the gallbladder, leakage of bile into the subhepatic space is common. This drainage is best removed by a pliable double lumen catheter inserted like a Penrose drain without suction; copious and persistent drainage may indicate use of suction.

Pancreatic Surgery. Any type of surgery on the pancreas, including biopsy, calls for insertion of a drain with immediate suction to remove pancreatic juice from the free peritoneal cavity as completely as possible.

Gastric Surgery. Leaks from a duodenal stump carry a notoriously high mortality. A tube drain is placed nearby without touching the duodenal suture line, preferably in the subhepatic space. Where doubt exists as to the safety of the duodenal closure, it may be wise to leave the drain in for 8 to 10 days, using suction as indicated.

Colon Surgery. The lumbar gutters can be drained if the denuded surfaces are oozing. A drain placed near the area of anastomosis following resection is of great value in preventing a perianastomotic abscess which could perforate through the weakest point in the suture line into the bowel lumen.

Appendectomy. Opinions differ in this operation. Some surgeons believe that following perforation the area behind the cecum should be drained. Otherwise, the drain can be placed down to, but not through, the peritoneum. In the case of an appendiceal abscess in a critically ill patient, intraperitoneal insertion of a drain without removal of the appendix may be the procedure of choice, to be followed later by secondary appendectomy.

Gynecology. Except for the occasional instance of a perforated tubo-ovarian abscess, there appears to be little reason for drainage. In severe infections of the pelvic peritoneum, the space of Douglas can be drained in the hope of preventing formation of an abscess.

Renal Surgery. Whenever doubt exists as to the completeness of hemostasis, or where large oozing surfaces are left, drainage seems indicated. This also applies to surgery of adrenal glands.

Splenectomy. The proximity of the pancreas and the possibility of injury to it make drainage advisable whether or not a thoracoabdominal incision has been used.

Extraperitoneal Surgery. The main extraperitoneal areas requiring drainage are the retrorectal, pararectal, retropubic prevesical spaces, and retroperitoneal areas.

Vascular Surgery. Hematomas and subsequent infections are feared complications in vascular—especially arterial—surgery. Use of a suction drain has been helpful in obtaining dry wounds.

It is well to stress that, not unlike antibiotics, drains cannot be expected to compensate for poor surgical judgment or technic. Meticulous surgery will always continue to be mandatory; drainage cannot compensate for a poorly performed anastomosis or inadequate blood supply to the bowel.

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Special Report of the Surgeon General
on His Trip to Africa



In his capacity as medical officer with the Foreign Affairs Committee on Africa which made an official visit to that continent during December 1960, and as Chairman of Board of Trustees, Foundation for All Africa, and Chairman of the President's People-to-People Foreign Relations Committee on Africa, RADM Bartholomew W. Hogan, Surgeon General of the Navy, reports his observations on the medical status and needs of many of the African nations.

'As the medical officer with the Foreign Affairs Committee on Africa, I accompanied the Committee to Egypt, Ethiopia, Tanganyika, Zanzibar, Kenya, Uganda, Nigeria, Liberia, Ghana, and Morocco. It was my purpose to visit government hospitals and rural health clinics as well as the hospitals

and clinics operated by the various missionary groups. In addition, I met with the Prime Ministers and Governors-General and interviewed the Ministers of Health and the Chief Medical Officers in most of these areas. The visits and interviews provided some understanding of the medical problems in each country and the thinking of the responsible medical leaders as how best to cope with these problems.

To appreciate the medical needs of these areas, it is important to understand one common background in each country—that is, the poverty, the widespread disease, and the ignorance of large sections of the population, also the apparent lack of enthusiasm to contribute personal efforts toward a change.

The adjustment to better standards will have to be brought about by:
(1) Health programs; (2) Education and economic improvements; and (3) Awareness by the masses of population of their personal and civic responsibilities.

The immediate medical needs are qualified medical personnel at all levels: (a) nurses, (b) technicians, (c) physicians, and (d) out-patient rural dispensaries.

The nurses' and technicians' training centers should be expanded and assisted by full-time teachers from other countries in order to accelerate this program. The medical and dental assistants' training program at Dar es Salaam, Tanganyika, and at Nairobi, Kenya, is an excellent means of providing partially-trained but adequate medical personnel to fill the great void now present and for years ahead between having no doctor and one doctor for 30,000 to 50,000 people.

There exists at present a bottleneck in the training of African physicians as there is a lack of qualified candidates with middle school training. The only medical school in East Africa is the University of Makerere, Uganda, with an annual output of approximately 40 graduates to serve four countries: Tanganyika, Kenya, Uganda, and Zanzibar. The best qualified African physicians should be given postgraduate training in the United States or the United Kingdom to provide a minimum number of specialists and teachers. There is a good medical school in West Africa at Nigeria and one is proposed for Ghana to be built and staffed by the United States.

The hospitals visited in East Africa impressed me by their cleanliness and by their competent and dedicated personnel, mostly British. Adequate African nursing personnel was available and excellent training programs were in operation. The medical facilities and organizations in several countries consisted of a general hospital serving a large geographical area with satellite rural dispensaries. These dispensaries were staffed by a medical assistant, a midwife, a health educator, a health inspector, and a nurse. These facilities provided satisfactory outpatient services and some also had 10-12 beds for acute illnesses. A physician made visits to these rural dispensaries once every 7 to 10 days for the purpose of seeing problem cases.

This system of medical care is considered to be good except that there is such an insufficient number of facilities and trained personnel for the population needs.

Preventive medical programs such as smallpox vaccination are most inadequate. The principal diseases seen are tuberculosis, malaria, leprosy, intestinal worms and infections and malnutrition. Smallpox even though it is one of the easiest infectious diseases to control was prevalent in Tanganyika and in other areas visited.

The urgent needs of these countries are in the fields of education and health. I would place health first as one must have the minimum health to accept education. A sick people means a sick nation.

The United States could be of great assistance in the following medical fields:

1. Providing doctors recently graduated from medical school and internships on a volunteer basis. These doctors would discharge their

obligated military service as members of the U.S. Public Health Service serving in a foreign country, or as civilians in Mr. Kennedy's Civilian Peace Corps.

2. Trained nurses to assist in the nurses' training program in these countries.

3. Technicians to assist in the training programs for technicians.

4. Sanitary engineers.

5. Veterinarians.

6. Providing small rural outpatient facilities.

7. Research to be carried out in the United States with a small field laboratory in Africa on some of the major public health problems in Africa, for instance, malaria, tuberculosis, human sleeping sickness, and also the sleeping sickness of cattle—this disease destroys the economy of a country, also it deprives the people of the necessary protein required in their diet—such as milk and meat. Wiping this out would bring great goodness to a country.

Throughout my journey, I visited various missionary groups who had medical facilities as part of their mission. These included Seventh Day Adventist, Anglican, Catholic, and Lutheran. These missionaries come from various European countries and from America, and we should all recognize how valuable and important they are in presenting the Western image to the people. They live and work at the people's level, they understand the hopes, desires, and aspirations of the people. They seek no commitments and they represent tangible evidence in the health and education fields of doing something to improve the well-being of the African. I strongly recommend that whatever the United States may do in Africa, the channeling of some assistance through these established facilities should not be forgotten.

In African affairs we cannot lead the Africans. With a proper modesty we can help Africans to work out the problems of their own emerging democracies and at the same time do a great deal to help anchor the declining prestige of the United States, not only in Africa but throughout the world. This means that we must seek to help Africa—and seek to make ourselves known to Africans through other channels than those of government alone. We must bring the now free citizens of Africa and the citizens of the United States together on a people-to-people basis. We must reach the people of the new democracies not only through governments and nationalistic movements and the more formal channels of communication, but we must understand their culture and be able to speak to the people as individuals. Nothing so flatters a man as to be treated as an individual—and nothing so insures respect given in return.

In Africa we have a wonderful opportunity to accomplish this very easily because already in Africa there are scores of Americans—missionaries, businessmen, travelers—and each of them, with guidance, can be an ambassador for the United States on the frontier outposts, the strange names of which are becoming so suddenly and startlingly familiar.

These men, whatever their sponsorship, clerical or lay, can assume roles of leadership in the cultural development of the Africans, and the wise among them already know that the most essential part of such development is health. A sick people means a sick government. Only a healthy, well, and happy people can survive—to function as a democracy co-equal with the other democracies of the world. So the aim of even our medical missionaries must be primarily not only to treat and cure, but to enhance cultural growth. Such endeavors more than anything else, will help Africa to enjoy and benefit from democracy, and such education, if given by us with proper modesty, will do much to reestablish American prestige throughout the world.

In conclusion I might add that America has one great asset in helping Africa, and that is, talented and dedicated American Negroes. America is in fact the one country that has this asset to so high a degree. The Eastern European countries do not have it at all.

I am deeply appreciative of the privilege of accompanying this hard-working dedicated Committee on this visit to Africa.

B. W. HOGAN"

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RADM Edward C. Kenney Nominated
for Surgeon General



On 10 January 1961, the White House announced that RADM Edward C. Kenney MC USN, Deputy Surgeon General since 1959, had been nominated to succeed RADM Bartholomew W. Hogan as Surgeon General of the Navy, and Chief of the Bureau of Medicine and Surgery. As the News Letter went to press, the nomination was awaiting confirmation by the United States Senate. ADM Hogan will retire on 15 February 1961 after a six-year assignment as Surgeon General.

The newly designated Surgeon General is a product of Ohio—birth in Corning, early education in the local public schools of Bucyrus, Bachelor of Science degree from Dennison University in Granville, and Doctor of Medicine degree from the University of Cincinnati College of Medicine in 1929. He was appointed Assistant Surgeon with the rank of Lieutenant, (junior grade), in the U. S. Navy on 4 June 1929; subsequently, he advanced through the several grades, attaining the rank of Rear Admiral on 1 September 1957.

After internship at the U. S. Naval Hospital, Philadelphia, ADM Kenney served at various stations ashore and afloat at increasing levels of responsibility, and pursued various periods of postgraduate instruction and training. During the period, 11 - 12 October 1942, as Senior Medical Officer aboard the USS BOISE, he participated in the Battle of Cape Esperance, Guadalcanal. For "extraordinary heroism" during action against enemy Japanese during that time, he was awarded the Navy Cross. The citation states in part, ". . . After the early part of the action, when hazardous conditions forced him to evacuate wounded personnel from sick bay to wardroom, LCDR Kenney, carrying on until that area also became untenable, removed them to the galley. . . . He continued to administer to them and others with such professional skill that not a single man under his charge died as a result of wounds sustained. . . ."

From July 1944 to July 1945, ADM Kenney served as Staff Medical Officer for Amphibious Group Three, Pacific Fleet, and participated in landings on Guam, Leyte, and at Lingayen Gulf. He was awarded the Bronze Star Medal with Combat "V", for meritorious service in that assignment, "demonstrating professional skill and efficiency under trying combat conditions." In February 1953, he became Executive Officer, U. S. Naval Hospital, Philadelphia, and Commanding Officer, U. S. Naval Hospital, Jacksonville, Fla., in 1955. Later in that year, he was named Commanding Officer, U. S. Naval Hospital, Bethesda, Md. In March 1958, he became Assistant Chief of Bureau for Personnel and Professional Operations; and in May 1959, he was selected to be Deputy Surgeon General and Assistant Chief of the Bureau of Medicine and Surgery.

In addition to the Navy Cross and Bronze Star Medal, the Surgeon General-designate has received eight other military awards and decorations. He is a member of the American Medical Association, a Fellow of the American College of Physicians, and a Diplomate of the American Board of Internal Medicine. He is also a member of Sigma Alpha Epsilon and Alpha Kappa Kappa fraternities.

RADM Kenney and his wife, the former Helen Ruth Dern of Washington Court House, Ohio, have two children, Mrs. Joan Kenney Diamond of Orlando, Fla., and James Warren Kenney, a student at the University of Maryland, and two grandchildren also of Orlando.

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Medical Department Performance
Appreciated by CNO

The Chief of the Bureau of Medicine and Surgery, and Surgeon General of the Navy, RADM Bartholomew W. Hogan, recently received a memorandum from ADM Arleigh Burke, Chief of Naval Operations, expressing his appreciation for the many contributions that Navy Medical Department personnel have made to the United States Navy in recent months. Coming near the close of his Naval

career and six-year tenure as Surgeon General, ADM Hogan is particularly appreciative of ADM Burke's comments, and transmits his appreciation, in turn, to all personnel—civilian as well as military—who have contributed to the high level of Medical Department performance which prompted the Chief of Naval Operations's comments.

ADM Burke pointed out: "Many vital things are happening all over the world. Present conditions demand the constant attention of all of us. New nations are being formed at a rapid rate and Communists are attempting to infiltrate their philosophy everywhere. Acceptable solutions to the many diverse problems in the crucial international situation require the special consideration of already too busy people."

Noting the advances being taken in all phases of industry and science which result in a tremendous increase in complexity and demand for more knowledgeable personnel to make use of the technics coming into existence, ADM Burke stated: "As a result of these many elements requiring constant close attention, it sometimes happens that many significant events and achievements of our civilian and military personnel which occur in daily routine are overlooked." An example of this situation, CNO recognized, is the tremendous effort Medical Department personnel have been making to reduce the length of patient stay in Naval hospitals.

As a result of his reflection on the performance of the Medical Department, ADM Burke expressed appreciation to the host of competent and dedicated personnel. He cited contributions to Operation Deep Freeze, and the invaluable research developments in many fields including those associated with space flight. He particularly recognized the many and varied individual, as well as group, contributions of Medical Department personnel to the health and welfare of the people around the world from the victims of the earthquake in Morocco to the people of the Sudan and Brazil who have been protected by immunization programs and to the people of Thailand, Egypt, Taiwan, and North Borneo who will benefit from epidemiologic studies of diseases endemic to their areas. The many educational and training programs instituted by the Medical Department for its own personnel as well as for medical personnel of other nations, were also considered to be outstanding examples of performance to be commended.

Concluding his comments of gratitude to ADM Hogan, ADM Burke wrote: "For all of these efforts, and for the many others that you and the people in your fine organization are exerting for a ready, healthy, modern Navy, I extend my thanks. The strength of our Navy lies in our people and their health is a major factor in their performance. Please assure Medical Department personnel that the contributions they are making to maintain the Navy that the United States needs are deeply appreciated by us all. Our success as a Navy is the integration of many individual successes and sacrifices."

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Portrait of Retiring Surgeon General Unveiled

On Monday, 16 January 1961, at the National Naval Medical Center, Bethesda, Md., a portrait of RADM Bartholomew W. Hogan, Surgeon General of the Navy, who will retire on 15 February 1961, was unveiled and accepted for the Department of the Navy by The Honorable Fred A. Bantz, Under Secretary of the Navy. The painting will be on permanent display in the Edward Rhodes Stitt Medical Library of the Naval Medical School at the Center to take its place among portraits of other Surgeons General of the Navy.

The oil painting, the work of the nationally renowned portrait painter, Bjorn Egeli, was commissioned by the Navy Medical Department Historical Society. The Society, founded in 1956, desired that the portrait of ADM Hogan be painted in order to memorialize the six years of his achievements and contributions as Surgeon General, and to perpetuate his memory as a distinguished member of the Navy Medical Department. The portrait was presented to the Department of the Navy by RADM Frank P. Gilmore, Assistant Chief for Planning and Logistics, BuMed, and Chairman of the Medical Department Historical Society.

Mr. Bantz, in accepting the portrait, reminisced briefly on his personal and official relationships with ADM Hogan, and emphasized the contributions that the Surgeon General had made to betterment of international understanding and goodwill. In evidence of these efforts, Mr. Bantz cited decorations awarded by France, Peru, and Sweden to ADM Hogan.

Expressing approval of Mr. Egeli's painting, ADM Hogan recalled how he first became acquainted with the artist's work during a visit to England a few years ago. Impressed with Egeli's artistry, when he was approached by the Historical Society for permission to have his portrait painted, ADM Hogan stated that he suggested to the Society representatives that Mr. Egeli might be available. Tracing the artist's early years in Norway, his arrival in the United States in his early "teens," alone and almost penniless, and eventual eminence as a portrait artist in this country, ADM Hogan pointed to this Horatio Alger-like career as a symbol of the opportunities of this country which Americans too frequently take for granted.

Concluding his remarks, ADM Hogan acknowledged the recognition given him by the Historical Society and the remarks of Mr. Bantz, by stressing that no one person in the Navy Medical Department—including civilian employees—was indispensable: the Department must and does operate as a team. He emphasized that the loyal and devoted personnel and employees throughout the Medical Department complex contributed to the achievements for which he was being credited. Approaching his retirement after more than 35 years of service, ADM Hogan expressed his appreciation to all hands for jobs particularly "well done" during his six years as Surgeon General.

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From the Note Book

Medical Department Receives "In Memoriam" Plaque. Honoring the late VADM Ross T. McIntire MC USN, former Surgeon General of the Navy, an "In Memoriam" plaque was presented to the Medical Department of the Navy by Major General Melvin J. Maas USMC (Ret), Chairman of the President's Committee on Employment of the Physically Handicapped. The plaque, in recognition of ADM McIntire's efforts with the committee as first chairman (from 1947 to 1954), memorializes him as a "volunteer extraordinary and ambassador plenipotentiary for the handicapped of all nations." (TIO, BuMed)

CAPT Canty Receives Medal. The President of Mexico, Lopez Mateos, has presented the Eduardo Liceaga Medal to CAPT Thomas J. Canty MC USN, Chief of the Amputee Center and Director of the Prosthetic Research Laboratory at the U.S. Naval Hospital, Oakland, Calif., in recognition of his services to Mexico in the field of rehabilitation of the physically handicapped. CAPT Canty was the only physician from the United States to receive the honor which was presented to physicians who were judged to have made the greatest contributions to Medicine in Mexico during the last 50 years. CAPT Canty has acted in advisory capacity to Mexico since 1948, and gave particular assistance in the establishment of the Mexican Institute of Rehabilitation. (TIO, BuMed)

"Man of the Year" for 1960. CAPT E.A. Anderson MC USN has been given the public service award of the American Federation of Government Employees and named their "Man of the Year" for 1960. The award was for his outstanding work on the recent Rhode Island polio epidemic for which he received the State of Rhode Island "Star." (CHINFO Newsletter, January 1961)

Hepatitis and Poliomyelitis, 1960. During the calendar year 1960, more than 41,000 cases of infectious and serum hepatitis were reported in the U. S. This is about 77% more cases than were reported in 1959, the highest figure since 1954 when 50,093 cases were reported. Mortality data for 1960 are not yet available. Unlike the increase in cases of hepatitis, the number of reported cases of poliomyelitis dropped sharply from the 1959 figures: the total number of cases is about 62% less and the number of paralytic cases is about 60% less. The total for 1960—less than 3300—is the lowest figure since 1938 when 1705 cases were reported. (Morbidity and Mortality, January 6, 1961)

Bronchoscopy and Bacteremia. Approximately 50% of a series of patients undergoing bronchoscopy showed a febrile response about 4 hours after the procedure. Of these, 33.3% were shown to have suffered a transitory bacteremia. The danger of bacteremia in patients with congenital or rheumatic cardiovalvular disease is stressed. A program of oral hygiene and antibiotic

prophylaxis is urged for patients with congenital or acquired cardiovalvular disease in whom bronchoscopy is contemplated. (S. Burman, J Thor Cardio Surg, November 1960)

Renal Autoregulation. Within certain limits of systemic blood pressure, under normovolemic conditions, the kidney maintains uniform renal blood flow by a process of autoregulation. However, the authors demonstrated in dogs that under conditions of hypovolemia, despite maintained systemic blood pressure, renal blood flow was generally reduced, often to critically low levels. (G. Bounous, et al, Surg Gynec Obstet, November 1960)

Owren's Capillary Blood Thrombotest. The author describes his experience with the convenient and useful capillary blood Thrombotest described by Owren. The principal advantages of the Thrombotest lie in (1) its all-in-one reagent which is diluted with distilled water and instantly ready for use; (2) use of capillary blood and avoidance of venipuncture; (3) the control curve which is specific for each lot that is provided with the reagent; (4) availability of the equipment needed, and the easy development of the necessary skill. (A. Seaman, Ann Int Med, November 1960)

L. E. Cell in Rheumatoid Arthritis. In most instances, the presence of the L. E. cell in cases of chronic polyarthritis probably does not signify existence of two diseases. It may represent rheumatoid arthritis in which the L. E. cell is only an incidental finding or it may signify systemic lupus erythematosus in which the joint involvement is one of the many features of this disease. (E. Toone Jr, et al, Amer J Med Sci, November 1960)

Chloral Hydrate and Rum—Recipe for Analgesia in Labor. This recipe comes from Jamaica—a ready source of excellent rum—and in the hands of the author provides sedation, analgesia, hypnosis, euphoria, and vasodilation in a safe manner for delivery of the average uncomplicated case. In addition, it provides readily available calories and therefore spares protein. This Jubilee cocktail is proposed as a useful addition to the store of analgesics used by the obstetrician. (I. Parboosingh, J Int Coll Surg, December 1960)

Burn Wounds. After 13 years experience including treatment of more than 1200 hospitalized patients, and with 10 years experience with exposure therapy for lesions of all degrees and extent of body surface involvement, the authors have noted a tendency toward greater flexibility in the handling of the individual case, and an inclination toward simplification of management of the burn wound itself. Supportive therapy is of greatest importance, although it is impossible to dissociate it from local care. Efforts to combat infection by active antibacterial treatment of the wound itself have been disappointing. (T. Blocker Jr, et al, Plast Reconstr Surg, December 1960)

DENTAL**SECTION**The Hardness of Enamel and Dentine

E. Newbrun and W. Pigman, University of Alabama Medical Center, Birmingham, Ala. Australian Dental Journal 5: 216-217, August 1960.

The following observations outline experience with the use of fluorides for inhibiting dental caries.

1. The surface hardness of enamel usually falls in the range of 300 to 400 Knoop Hardness Numbers (KHN), whereas dentine has been found to be considerably softer, falling in the range 60 to 150 KHN—usually 60 to 80.

2. No clear effect of age and sex on enamel hardness has been shown. On the basis of present evidence, it is doubtful that either bear any relation to the hardness.

3. Anterior and posterior teeth and teeth on the right and left sides do not differ significantly in hardness.

4. Considerable controversy exists concerning whether enamel decreases in hardness towards the dentino-enamel junction, but surface enamel certainly appears to be harder than subsurface enamel. Wide variation in hardness exists even between closely adjacent areas of enamel.

5. Caries susceptibility cannot be predicted by the initial hardness of enamel or dentine. However, hardness changes are suitable for the measurement of the progress of natural and artificial carious lesions.

6. Although topical applications of fluorides have been said to increase enamel hardness, subsequent investigations have been unable to reproduce these findings. Topical fluoride treatment does appear to decrease the rate of softening of enamel. Excessively high amounts of fluoride taken systemically during the period of tooth development may decrease the enamel hardness. Teeth from areas with optimal amounts of fluoride do not differ significantly in surface hardness from teeth in low fluoride areas.

7. Artificially softened enamel apparently can be rehardened in vitro over a period of one to two weeks.

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Aspiration Before Injection

Occasionally, there appears in public print a highly sensationalized report of a death in a dental office supposedly caused by the injection of a local

anesthetic. Such reports serve no good purpose by unduly and unnecessarily alarming the general public. They may, however, serve the good purpose of reminding the practitioner that anesthetic agents are drugs, that no drug is absolutely safe, that every drug is dangerous in overdosage, and that the injection of an anesthetic solution is never entirely free from hazard.

The toxicity of an accepted local anesthetic agent is low when the solution is injected intramuscularly or subcutaneously because of the moderate rate of entrance of the drug into the circulation. If, however, the same amount of the solution is injected intravascularly at the same rate, its toxicity is greatly increased. This increase is particularly evident if the agent is administered intravenously, as the full effect of its potency is immediately felt systemically.

In order to avoid the hazards of inadvertent intravenous injection, most hospital standards long since have required that no injection be made without first withdrawing the syringe needle plunger to determine whether the point of the needle has been inserted in a blood vessel. Many dentists have adopted the same precautionary procedure. All should do so.

Harris points out that there appear to be three main reasons why aspiration before injection is not practiced more generally in dentistry: (1) some dentists think that when a needle point is in a blood vessel, blood will enter or can be "teased" into a nonaspirating cartridge, (2) some dentists believe—because so little on the subject has appeared in the literature—that the incidence of penetration of a blood vessel is insignificant in dental injections, and (3) many dentists underestimate the hazards of intravascular injection. Until these misconceptions are corrected, many dentists will continue to subject their patients to unnecessary risk and themselves to unnecessary trouble.

Studies in which an aspirating type of syringe was employed have shown that a blood vessel is penetrated in an average of over 3% of injections. Another investigator has reported informally that he has found the incidence of positive aspiration to be as high as 8%.

If it is assumed that the incidence of intravascular penetration is about the same when aspiration is not practiced, it follows that dentists may inadvertently inject local anesthetics directly into the blood stream of 2 to 8 patients in every 100 to whom a local anesthetic is administered.

A fine gauge needle should not be used when aspiration is practiced. The use of a fine gauge needle may prevent the ready withdrawal of blood even when the point is within a vessel of considerable size. Unless the lumen of the needle is sufficiently large, false negative results may be observed on aspiration; if the injection is performed in these instances, the solution will enter the blood stream.

The Council on Dental Therapeutics of the Association has adopted the following statement of policy relative to avoidance of intravascular injection:

"The Council on Dental Therapeutics urges the practice of aspiration routinely before the injection of local anesthetics in order to determine that the needle has not penetrated into a large blood vessel. The Council believes (1) that with equipment presently available, aspiration may be accomplished most effectively by employing a glass syringe (luer type); (2) that if this type of syringe cannot be used, then one of the aspirating type of cartridge devices should be substituted, and (3) that because it is difficult to aspirate blood through needles of small lumen, the injection needle should not be smaller than 25 gauge. "

Although the incidence of fatalities attributable to the administration of a dental anesthetic is extremely low, every effort must be made to reduce it even lower. One method by which this can be done is for every dentist to make a standard practice of aspirating before injecting. (Editorial, JADA 55:259, August 1957)

NOTE: In the Navy, in order to fulfill a requirement for an aspirating syringe for use with local anesthetic solutions packaged in glass cartridges of 1.8 ml capacity, the following item has been standardized:

<u>Stock Number</u>	<u>Item Identification</u>	<u>Unit of Issue</u>	<u>Unit Price</u>
6515-619-8918	SYRINGE, CARTRIDGE, Aspirating, Thumb Ring Handle: With one long hub, one short hub, and two harpoons. For needles, order Index No. 7305 and 7310. For use with lidocaine hydrochloride injection, 6505-261-7240 and 6505-576-8842.	Each	\$6.30

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Newly Standardized Items

To provide additional sizes and shapes of dental excavating burs for use in dental operative procedures; to meet professional requirement for an additional universal type dental extracting forceps for use in oral surgical procedures involving certain upper and lower teeth and roots; to meet requirement for a matrix retainer of a size suitable for use in dental operative procedures on younger age group patients, these items have been standardized:

<u>Stock Number</u>	<u>Item Identification</u>	<u>Unit of Issue</u>	<u>Approx Unit Price</u>
6520-656-1349	BUR, DENTAL EXCAVATING, Angle Handpiece, Tungsten Carbide, No. 2: Round	Each	\$ 0.44

<u>Stock Number</u>	<u>Item Identification</u>	<u>Unit of Issue</u>	<u>Approx. Unit Price</u>
6520-656-1462	BUR, DENTAL, EXCAVATING, Angle Handpiece, Tungsten Carbide, No. 901: End Cutting	Each	0.46
6520-656-1609	FORCEPS, TOOTH EXTRACTING, No. 101	Each	5.40
6520-687-8107	RETAINER, MATRIX DENTAL, TOFFLE-MIRE, Junior Size. Without bands. For Matrix Band Set order 6520-682-6530.	Each	8.50

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Tooth Facings and Backings Contract. Copies of a negotiated contract (No. N32-8076) with the Columbus Dental Manufacturing Company for local procurement of Tooth Facings and Backings and Porcelain Dental Powders and Accessories, effective 1 January 1961, have been sent to all dental activities having prosthetic facilities. Requests for additional copies of, or information pertaining to, this contract should be addressed to: Chief, Field Branch, Bureau of Medicine and Surgery, 3rd Ave. and 29th St., Brooklyn 32, N. Y. (Attn: Code 42B).

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Personnel and Professional Notes

CAPT Losee Addresses Graduating Class in New Zealand. On 8 December 1960, CAPT F. L. Losee DC USN, gave the principal address at the graduation ceremony of medical and dental students at the University of Otago, N. Z. CAPT Losee is Acting Director of the dental research unit of the New Zealand Medical Research Council.

Dental Officers at Greater New York Meeting. At the Greater New York Dental Meeting held recently in New York City, five Navy Dental officers participated in the professional meetings. CAPT C. A. Ostrom, Naval Medical Research Institute, Bethesda, Md., discussed Pulpal Response to Implants of Chemical Treated Heterogenous Bone. The others—and their subjects—from the U. S. Naval Dental School, NNMC, Bethesda, Md., were: CAPT G. W. Ferguson, Restorations of Amalgam; CAPT J. E. Flocken,

A Clinical Workshop with Televised Teaching of Rubber Base Technique for Fixed Prosthesis; CDR G.H. Rovelstad, Diplomate, American Board of Pedodontics, The Role of Salivary Corpuscles; and LCDR S.O. Bartlett who was monitor of the U.S. Navy Dental Corps Exhibit, Education in Dentistry.

CAPT Heartwell Retires. CAPT Charles M. Heartwell DC USN, Diplomate, American Board of Prosthodontics, was transferred to the Retired List of the Navy on 1 January 1961 after 20 years of active service. CAPT Heartwell was born in Lawrenceville, Va., and graduated from the School of Dentistry, Medical College of Virginia, Richmond, Va., in June 1932. In September 1940, he accepted a commission as Lieutenant (junior grade) in the U.S. Naval Reserve and reported to the U.S. Naval Training Station, Norfolk, Va., for duty. Among the many ships and stations that CAPT Heartwell has served aboard are the USS SHENANDOAH, USS CLYTIC, and at the U.S. Naval Dental Clinic, Yokosuka, Japan. Prior to his retirement, CAPT Heartwell was on duty at the U.S. Naval Dental Clinic, Norfolk, Va.

Technicians' Graduation at NDS. Twenty Dental technicians graduated from the Enlisted Schools of the U.S. Naval Dental School, NNMC, Bethesda, Md., 16 December 1960. Present at exercises in the Dental School Auditorium were two former heads of the School's Enlisted Education and Training Department, CAPT M.L. Parker DC USN, Head of the Standards and Training Section, Professional Branch, Dental Division, BuMed, and guest speaker CAPT K.L. Urban DC USN, now Executive Officer of the U.S. Naval Dental Clinic, U.S. Naval Weapons Plant, Washington, D. C.

CAPT Urban, in his address on the increasing national tendency to expect "something for nothing" asked the graduates to instill a spirit of self-reliance in themselves and their families and not to become self-satisfied with the many social, health, educational, and religious programs offered by the Service.

RADM E.G.F. Pollard DC USN, Commanding Officer of the Dental School, held meritorious mast. Letters of commendation for outstanding scholastic and technical achievement were presented to Edward L. Corder, DTCA (P-1) of Omaha, Neb., and James D. Bentz, DT2 of Warminster, Pa. Whitney F.P. Miller DT1 of New Orleans, La., received the Thomas Andrew Christensen commemorative award. Established to honor the only Naval dental man posthumously presented the Navy Cross for extraordinary heroism, the award is presented from time to time to a graduate of an enlisted course of instruction. The recipient is chosen on the basis of his service record and service reputation.

CAPT M.G. Turner DC USN, Executive Officer, awarded certificates for successful completion of 6-month advanced training courses to the graduates. Both groups of technicians were trained under the direction of CAPT W.A. Newman DC USN.

RESERVE**SECTION**Officer Promotion Policies

Each year, from January until June, approximately 40,000 Naval Reserve officers focus their attention on the selection boards meeting in Washington, D. C. Of interest to them is background information on Reserve officer promotion policies and procedure.

Selection Boards. Each selection board is convened by precept from the Secretary of the Navy which lists the board members and establishes the number of officers that may be recommended for the higher grade.

Members of these selection boards are chosen from all parts of the country from among nominations submitted to the Chief of Naval Personnel by the naval district commandants and the Chief of Naval Air Reserve Training. To be eligible for consideration to serve on a selection board, nominees must meet the criteria set forth in BuPers Instruction 1421.1B. After the nominations have been made and screened, those officers who meet the requirements are then considered for selection board duty.

Officers who contemplate duty on a selection board should make certain that they meet all eligibility requirements so that they are not rejected before the actual selection phase. Many officers who are nominated fail to reach this point because of their promotional status or because they lack a quadrennial physical examination on record in the Bureau of Medicine and Surgery. Officers who meet all requirements are then selected on the basis of their qualifications in their designator category without regard to geographic location.

Names and records of all officers in an active status (Ready Reserve or Standby Reserve, S-1) who are in the promotion zone and who have established their eligibility for consideration are presented to the appropriate selection board by the Chief of Naval Personnel. The record of an officer who is eligible in all respects is presented to the selection board regardless of its condition. If a fitness report is missing and the board determines that the report is necessary for a fair evaluation of the record, the missing report will be requested.

Establishing Eligibility. To establish their eligibility for consideration by a selection board in Fiscal Year 1962 and thereafter, officers must have earned an average of 12 promotion points for each year in grade computed from 1 July following date of present rank to 30 June of the Fiscal Year preceding that in which the officer will be in the promotion zone. In no instance will more than 72 promotion points be required for consideration.

Performance Counts. Criteria for Selection. When the board convenes, it will establish criteria under which selections will be made. Performance is always the primary factor and an officer's entire record—including civilian occupation—is considered in measuring performance. The fact that officers may have earned all the promotion points possible or the fact that they have attended all drills and taken two weeks' active duty for training does not automatically result in selection. These factors enhance an officer's record, but do not guarantee his selection. (The Naval Reservist, December 1960)

(To be continued in an early issue)

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ACDUTRA for Non-Drill Pay Officers

The Chief of Naval Personnel recently authorized an additional limited number of active duty for training with pay quotas for non-drill pay officers for the remainder of Fiscal Year 1961.

Ready Reserve Medical Department officers on inactive duty who are not in a drill-pay status should submit applications for active duty for training with pay to their respective commandants. Training duty requested should conform to the following guidelines: (1) There must be a mobilization requirement for the training. (2) The Reservist must have need for training by reason of Reserve affiliation, grade, designator, age, and prospective mobilization billet. (3) Training must be taken at the appropriate activity nearest the Reservist's home.

Commandants have been requested to follow the following priority in approving active duty for training for non-drill pay Reservists: (1) Personnel on Departmental and District War Plans List who require training to enhance their mobilization potential. (2) Personnel qualified to fill billets for which quotas have been levied on the Commandant or the Chief of Naval Air Reserve Training. (3) Personnel who are members of Specialist Units but who do not qualify under (1) and (2) above. Within this group, priority is given to officers who have not performed active duty for training with pay in Fiscal Year 1960, with preference to junior officers.

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CO's Seminar. In November 1960, a seminar for commanding officers (or representatives) of Reserve Medical Companies in the 8th, 9th, 11th, 12th, and 13th Naval Districts was held at Headquarters, 9th Naval District, Great Lakes, Ill. Attending were 25 officers representing 20 of the 25 authorized medical companies in these districts: 8th, none of 3 units; 9th, 12 of 13 units; 11th, 2 of 3 units; 12th, 5 of 5 units; and 13th, 1 of 1 unit. The seminar provided indoctrination and orientation in organization, administration, and operation of the Reserve Program with emphasis on the medical components.



OCCUPATIONAL MEDICINE

Toxicology of Some Alcohols

E. V. Henson MD, Union Carbide Chemicals Company, South Charleston 3, W. Va. The Toxicology of Some Aliphatic Alcohols - Part II. J Occup Med 2:499-501, October 1960.

Ethanol

Ethanol (ethyl alcohol, grain alcohol, $\text{CH}_3\text{CH}_2\text{OH}$) is a colorless flammable mobile liquid with an aromatic odor. It is completely soluble in water, has a molecular weight of 46.07 and boils at 78.3 C. This alcohol is used extensively as an antiseptic, tissue preservative, solvent in pharmaceutical tinctures, and a solvent for a great list of materials found in industry and the home. Its further appearance in the chemical industry is as an intermediate in the production of acetaldehyde, acetic acid, ethyl ether, and esters. Ethanol is made by fermentation of sugars which forms grain alcohol, and catalytically, from ethylene and acetylene. Pure alcohol is hygroscopic and forms a constant boiling mixture with water so that ordinary distillation yields a product containing 95.6% alcohol by weight. Special methods are required to remove the remainder of the water to make 100%—or absolute alcohol. Denatured alcohol is ethanol containing adulterants as pyridine, methanol, benzene, and others which discourage its use as a beverage; it is exempt from the tax on alcoholic beverages.

The strength of beverage alcohols is measured in proof. Proof spirit (100) in the United States contains 50% alcohol by volume, in Great Britain 49.3% alcohol by weight or 57% by volume.

The American Medical Association Councils on Mental Health and Food and Nutrition have published several reports which explain current opinions about the metabolism and physiologic effects of ethyl alcohol. Summaries of these reports are presented herein.

Water soluble ethanol is absorbed without digestion directly and rapidly from the stomach and intestine, the rate of absorption being proportional to the concentration. Following a single dose of 8 oz of whiskey, maximum blood concentration is reached in approximately one hour. The absorption rate is slowed if the alcohol is highly diluted, and possibly also if the

concentration is sufficiently high to cause mucosal irritation and stimulation of secretions; it is delayed when food is present in the stomach. Prolonged inhalation of vapors—as may occur in industrial employment—can cause symptoms, but the amount absorbed through the skin has no practical significance.

After absorption, alcohol is distributed throughout the body being more concentrated in tissues of high fluid content. All tissue concentrations are determined by the blood level, although there is a lag in the response of tissue levels to the rise and fall of the blood level, as can be demonstrated by cerebrospinal fluid determinations. Ethyl alcohol is cleared from the body primarily by oxidation; a small quantity is lost in the urine and expired air—usually about 4% with values occasionally as high as 10%. Large doses taken frequently tend to encourage renal and pulmonary elimination. Since bladder urine is a composite, a single urine alcohol determination represents an average for the time of its accumulation and does not accurately measure blood concentration at any one time. Measurement of the alveolar concentration of alcohol is more representative of the blood level at a given time and has medicolegal importance. When alveolar and blood concentrations are in equilibrium, approximately 2000 ml of expired air will contain the same amount of alcohol as 1 ml of blood.

Pharmacologically, ethanol is an anesthetic-narcotic agent with the same depressing actions as other materials so classed. Apparent stimulation results from suppression of cortical functions, releasing the person from intellectual inhibitions and the lower nerve centers from cortical control. With increasing blood levels there is increasing incoordination and inebriation followed by coma, respiratory failure, and finally, cardiac failure. Although deaths have occurred at lower levels, a blood concentration of 550 mg/100 ml is usually fatal if the patient is not treated. This level results from a single dose of about 3 gm/Kg and represents about one pint of whiskey.

Ethyl alcohol is metabolized primarily in the liver by way of the enzyme alcohol dehydrogenase which is also found to a lesser extent in the kidneys. Oxidation of alcohol to acetaldehyde is relatively slow, whereas oxidation of acetaldehyde to acetic acid or other acetyl compounds is rather rapid and takes place in many parts of the body. This step can be delayed or stopped by certain blocking agents, such as disulfiram and butyraldoxime which allow acetaldehyde to accumulate to toxic levels. When these substances are used deterrently, the unpleasant symptoms of nausea, vomiting, dyspnea, flushing, and palpitation discourage the patient from drinking alcohol. Studies utilizing isotope C have shown that more than 90% of ethyl alcohol carbons finally appear in carbon dioxide. The metabolic process—which yields 7 cal/gm has a maximum rate which is not influenced by the quantity in the body. Estimates of this rate vary, but the rate is about 200 mg/Kg/hr. A common statement is that man can metabolize 1 oz of

whiskey per hour. The rate may not be the same in all individuals or the same in one individual at different times. When the rate is less than maximum, it can be influenced favorably by administration of carbohydrate, protein, vitamins, and insulin, all of which have been used therapeutically; but the rate can never exceed the stated maximum.

The terms, tolerance, habituation, and addiction are often applied to the phenomenon of alcoholism and, sometimes, they are used interchangeably. Tolerance is an inherent metabolic quality which determines an individual's basic susceptibility to alcohol. It implies a capacity to consume quantities of alcohol with fewer physiologic effects than are experienced on the average. Habituation is tolerance acquired by repeated contacts. One who is habituated shows fewer effects from a given dose than do the uninitiated. This change is not the result of altered absorption, distribution, elimination, or metabolism, but seems to be an adaptation of the central nervous system to alcohol. A state of addiction is present when symptoms develop after withdrawal of alcohol. These symptoms may be of all grades of severity. The dependency upon alcohol from which addiction stems seems to be composed of psychologic and physiologic components. The person who experiences relief from anxieties and tensions following alcohol consumption is in danger of developing a dependency which can be highly detrimental. Some believe that cells develop a physiologic need for alcohol and that withdrawal symptoms appear when this need is not met—an interesting opinion which has not received universal acceptance.

Although ethyl alcohol yields 7 cal/gm, it is a poor nutritional source. When calories from alcohol displace those from conventional foods in the diet, nutritional deficiencies may be expected as a result of deprivation of essential fats, proteins, minerals, and vitamins. The relationship of cirrhosis of the liver to habitual alcohol ingestion has not been absolutely determined. Cirrhosis is found more commonly in those who use alcohol frequently, but it is also found among those who never drink alcoholic beverages. The liver, being the main organ for the detoxification of alcohol, may suffer from its direct toxic effect or the hepatic changes may be secondary to nutritional deficiencies. Although alcoholism has been studied extensively, many facets of this complex disease require elucidation.

Isopropanol

Isopropanol (isopropyl alcohol, 2-propanol, dimethyl carbinol, $\text{CH}_3\text{CHOHCH}_3$) is a colorless flammable liquid with an odor similar to, but less sharp than, ethanol. It has a molecular weight of 60.10, boils at 82.3 C, is completely soluble in water, and upon drying from the skin leaves a slight oil-like feeling. It has solvent properties like those of ethanol, which it has displaced in some industrial uses, for, since isopropanol is not suitable for drinking, its distribution and use in commerce are not hampered by legal restrictions that

regulate beverage alcohol. A common household product is isopropyl alcohol rubbing compound which is about 70% isopropanol in water. A 30 to 50% concentration of this alcohol in water is used as an antiseptic. Several commercial methods are available for its production, but most is manufactured by the reaction of propylene with sulfuric acid to form isopropyl sulfate followed by hydrolysis and recovery of the alcohol and acid.

Isopropanol is absorbed rapidly from the intestinal tract and lung, and is distributed throughout the body. It is oxidized slowly to acetone in the liver. Acetone also is an effective narcotic with approximately the same toxicity as isopropanol (LD₅₀'s 9.75 and 10.7 gm/Kg, respectively) and may contribute to the narcosis from isopropyl alcohol. The alcohol is cleared from the body unchanged via the lung and kidney and by oxidation to acetone which may be excreted or metabolized further.

Isopropanol is said to be twice as narcotic and twice as toxic as ethanol. When the LD₅₀ of ethanol, 21.3 gm/Kg, is compared with that of isopropanol (10.7) and when the estimated approximate human fatal doses are compared—250 and 160 ml, respectively—the statement about toxicity seems to be correct. However, when comparisons are made of blood alcohol levels of severely intoxicated patients, 130 to 150 mg/100 ml for isopropanol and 450 to 550 mg for ethanol, it would appear that the narcotic effect of isopropanol is approximately three times that of ethanol. In one case, acetonuria was reported and the odor on the breath resembled acetone; so acetone may add to isopropanol narcosis.

Human intoxications have occurred from the ingestion of isopropanol and following its use in large quantities (360 to 600 ml) in alcohol sponging of febrile children in confined, poorly ventilated areas. It was thought that these intoxications in children resulted from inhalation of the alcohol. One child became unconscious in 4-1/2 hours and another was found in a coma 9 hours after being wrapped in a towel saturated with the alcohol. The patients present unconsciousness, deep breathing or rapid shallow breathing, rapid pulse, and constricted pupils which do not respond to light. With supportive treatment, recovery can be expected in 24 hours.

Butanol

Butanol (n-butanol, butyl alcohol, $\text{CH}_3\text{CH}_2\text{-CH}_2\text{CHOH}$) is a colorless mobile liquid with pungent odor. It has a molecular weight of 74.12, boils at 117.7 C, and is soluble in water to about 7%. It can be made by the fermentation of sugars or synthetically from propylene or acetaldehyde by several production steps. Being an excellent solvent, it is used in manufacture of resins, varnishes, lacquers, and related substances.

Butanol is rapidly absorbed from the intestinal tract and pulmonary surfaces, and is metabolized completely by oxidation. Its primary physiologic effect is narcosis, being more active than the lower number of the

series. The LD₅₀, 4.3 gm/Kg is smaller than those for the lighter members, indicating greater toxicity. Irritation of the conjunctiva by vapors has been reported in the concentration of 50 and 200 ppm. Conjunctivitis and keratitis with pain and disturbance of vision associated with the presence of intracorneal vacuoles have been reported in workers exposed to n-butanol and to a mixture of butyl acetate and isobutyl alcohol. A similar condition described as "fine punctated turbidity of the superficial layer of the cornea"—which may represent the same pathology—followed exposure to butyl acetate and butyl alcohol.

A peculiar antihemorrhagic action of n-butanol has been observed. When the alcohol was given orally, intramuscularly, or intravenously in doses of 5 to 10 ml, active bleeding was stopped in 2 to 3 minutes in 24 of 25 patients with far advanced cancer. The authors concluded that the beneficial effect was related to the action of butanol on the metabolism of abnormal cells rather than on the clotting mechanism.

Welt reported use of n-butanol as a 7.9% solution in saline for the control of postoperative pain in otolaryngologic surgery. Doses of 5 to 10 ml for adults and 0.5 ml per year of age for children relieved pain in 90% of 938 patients treated. Following intramuscular injection of the dose, relief from pain was observed at times within 5 minutes and usually within 15 minutes. No ill effects were found after intravenous administration of 500 ml of a 7% solution of the alcohol in saline. Welt also reported that Ravich and Revici had given patients oral doses of 1500 ml daily for 10 days without any immediate or delayed undesirable side effects.

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Health Hazards of Recent Welding Practices

Charles P. I. Bergtholdt Sr, M.P.H., Director, Industrial Health Division, U.S. Naval Weapons Plant (Washington, D. C.) delivered a paper on some new developments in the field of welding at the 25th annual meeting of the Industrial Hygiene Foundation in Pittsburgh, Pa., 26 - 27 October 1960.

Processes which have introduced new potential health hazards were described: In electron-beam welding, parts are joined by bombarding them with a stream of electrons in a vacuum. K and L x-ray photon production takes place and is directly proportional to the atomic number of the target material. Due to the possibility of radiation exposure, welders and nearby personnel should wear film badges or other suitable monitoring devices. The arc-spot welding process leaves an irregular surface and thus a disadvantage to the chipper and grinder in post-weld cleanup is noted. Arc-spot welding processes which add filler material to the weld cause metal buildup or a button at the weld and produce additional noise, vibration, and dust. When ultrasonic welding is used, noise measurements should be made.

of the frequencies above the audible range as well as in the audible range. Ear protection should be considered until safe energy and frequency limits have been established.

New methods which have eliminated some of the hazards of conventional welding were also mentioned: In short-arc and dip-arc welding, there are no drops of free-falling metal from the arc in out-of-position welding. Skill requirements are lower than for conventional tungsten-inert-gas welding, thus reducing the welder's exposure time to welding fume and ultraviolet-produced oxidant gases as well as to spatter from hot sparks and molten metal. Little or no post-weld cleanup is required with a resultant decrease in noise from chipping and grinding and a decrease in the amount of respirable grinding dust dispersed. Foil seam welding has the advantage of good appearance, ease of finishing, and high welding speed. These are all health advantages when one considers the reduction of noise, dust, and oxidant gases on personnel exposure. Magnetic-force welding has the advantage of permitting the welding of vinyl-coated steels and other prefinished materials with no damage to the finish due to shallow heat penetration. This eliminates the objectionable decomposition products due to heat with conventional metal welding. (Industrial Hygiene News Report 3: 1, December 1960)

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Hazards of Handling of a High Energy Propellant Fuel

HiCal 3 is somewhat representative of all high energy boron hydrides. It is a clear mobile liquid, yellow-to-brownish-orange in color, with a characteristic foul odor. It is a mixture of alkylated boron hydrides and has physical properties similar to hydrocarbon fuels. It will hydrolyze and oxidize only slowly in water or air; it is not shock sensitive and is stable under normal storage conditions, but it may react violently with oxidizing materials and the hydrazines. With carbon tetrachloride—and probably other halogenated hydrocarbons—it forms extremely shock-sensitive mixtures.

With regard to health hazards, HiCal is highly toxic by inhalation, ingestion, and skin or eye contact. Its primary action is on the central nervous system and is manifested by tremors or convulsions in more severe cases. Muscular spasm, lack of coordination, tiredness, and sleepiness are common in cases of lesser exposure. Liver and kidney damage may also occur from over exposure. It should be noted, however, that all effects observed in humans have been temporary in nature and that there has been complete recovery in every case. In 19 cases of overexposure to alkyl boron hydride in one plant, only 4 resulted in removal of the man from the operation—each of the 4 was caused by skin contact. (G.A. Volz, Industrial Hygiene News Report 3: 3-4, December 1960)

Neoprene Ducts Resist Abrasion

In a plant manufacturing commercial abrasives, the ductwork in the dust-collection system takes a lot of severe punishment. The dust created during manufacturing operations is composed of extremely sharp hard particles. The Norton Company, Worcester, Mass., has been manufacturing abrasives since 1877. Dust removal has been one of the operating problems and many tons of sheet metal ducts have been eroded away since the company began business.

Many ingenious attempts were made to solve this maintenance problem. Air velocities were modified, pipes were rotated to equalize wear, and various protective coatings were applied. But still the ducts wore through in an uneconomically short time. About 6 years ago, spiral, wire-inserted neoprene hose was tried. It worked so well that its use was extended throughout the plant as replacements became necessary.

In dust collectors carrying abrasive particles at 3500 ppm and higher, neoprene elbows were found to have 12 times the life of galvanized iron or 16-gauge steel tubing. In addition to internal abrasion resistance, the flexible tubing also showed high resistance to external attack by oils, heat, and aging. William J. Samborski, Norton maintenance engineer, has found four important advantages in the neoprene construction: easy installation, self-gasketing, long wear, and flexibility for use with moving equipment. (National Safety News, October 1960)

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